

AACE
INTERNATIONAL
**RECOMMENDED
PRACTICE**

103R-19

**PROJECT CODE OF ACCOUNTS –
AS APPLIED IN THE MINING AND
MINERAL PROCESSING
INDUSTRIES TO FACILITATE
BENCHMARKING**

AACE
INTERNATIONAL



AAACE International Recommended Practice No. 103R-19

PROJECT CODE OF ACCOUNTS – AS APPLIED IN THE MINING AND MINERAL PROCESSING INDUSTRIES TO FACILITATE BENCHMARKING

TCM Framework: 7.1 – Project Scope and Execution Strategy Development
7.2 – Schedule Planning and Development
7.3 – Cost Estimating and Budgeting

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 7.2 – Schedule Planning and Development
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INTRODUCTION

This recommended practice (RP) is an industry-specific addendum to AACE® International Recommended Practice 20R-98, *Project Code of Accounts* [1]. This document describes suggested code of accounts (COA) as applied to projects in the mining and mineral processing industries. However, it is limited to defining the coding divisions for the product or deliverable and the discipline or prime account elements. For purposes of this RP, the work breakdown structure (WBS) refers to product-oriented (functional) elements. It is recognized that in some usage, WBS incorrectly reflects broader content than just the product-oriented element.

This RP by reference defers to the Level 1 coding structure for the discipline or prime account direct cost elements in Table 7 of RP 21R-98 [2] (*Project Code of Accounts as Applied in Engineering, Procurement and Construction [EPC] in the Process Industries*). However, this RP extends RP 21R-98 Table 7 to Level 2, primarily to highlight the importance of capturing the investment in mobile equipment for mining production (e.g., shovels) and infrastructure (e.g., rail engines) in the Equipment account.

This RP defines the mining and mineral process industries consistent with RP 47R-11, *Cost Estimate Classification - As Applied in the Mining and Mineral Processing Industries* [3]. That RP in turn refers to the Canadian Securities Administrators National Instrument 43-101 (NI 43-101) [4] definition of mining as “any exploration, development or production activity, including a royalty interest or similar interest in these activities, in respect of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal and industrial minerals”. This RP excludes subsea mining and also excludes coding for the oil and gas industries which is covered by ISO 19008:2016, *Standard cost coding system for oil and gas production and processing facilities* [5].

A mining and mineral processing facility may include, and this RP reflects, three broad types of integrated physical elements including the mine, process plant and infrastructure (on- and off-site including product transport). The main purposes of these three elements can be summarized as raw material extraction and handling, material processing, and facility support respectively. These three elements may reflect somewhat specialized sub-industries employing different engineering, procurement and construction (EPC) practices and different contractors. It is also common for owners to use their mining production resources to do some mine pre-development work. This

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combination puts a premium on developing a well thought out program and project WBS. Users of this RP should be familiar with the other industry coding references that the parties to the project may be familiar with, particularly in respect to the processing plant and infrastructure.

Mine site processing plants may be considered a subset of the process industries as described in RP 21R-98. These industries have the primary characteristic of having processing equipment as the core or primary physical component of the facility. Mining and mineral processes usually involve more solid and slurry materials than oil, gas and chemical plants which in turn involves more mechanical processes such as crushing, filtering and conveyance, but less piping; some process steps might also be unique for the mining process, e.g. autoclaves and or calciners for pretreatment. Metallurgical processes are also typical. Users should note that some process plant contractors may be familiar with ISO 19008 coding (formerly Norsok Z-014) or similar breakdowns.

Major mining projects, particularly in remote locations, usually involve extensive civil and infrastructure work including developing or improving roads, railroads, jetties, water supply and treatment, power and gas supply, as well as camp facilities and various buildings. Recently, a coding structure for civil and infrastructure projects was promulgated by the International Construction Measurement Standards (ICMS) Coalition group. [6] This RP considers the ICMS, but does not incorporate it directly due to this RP's purpose to integrate mine, plant and infrastructure.

The primary reference for this RP was the product of a joint industry group including four major mining companies and coordinated by Independent Project Analysis, Inc. (IPA). [7] This RP is indebted to that effort, but because the RP will address comments received from the industry at large, it is a unique product.

PURPOSE (AND RELATIONSHIP WITH OTHER STANDARDS)

The purpose of this RP is to provide the mining and mineral processing industry with a product or deliverable oriented project WBS so that communication and information sharing is improved among all industry stakeholders. The sharing will mainly facilitate the practices of cost benchmarking and conceptual estimating. In that respect, the guideline also includes key physical measurements associated with the WBS codes so that cost benchmarking, validation and estimating ratios, metrics and key performance indicators (e.g., cost per unit of production) can be developed, shared and compared between projects. It is not intended as a guideline for project control, but it is related.

For those needing to meet the requirements of NI 43-101 (or equivalent), this RP will facilitate preparation and benchmarking of capital cost estimates by or for *qualified persons*.

The recommended code is hierarchical to three levels of detail. The levels roughly correspond with the classes of estimates established in RP 47R-11 and that RP should be considered together with this one. Level 1 in this RP corresponds with the minimum level of scope detail for a Class 5 (Scoping in NI 43-101) estimate structure, while Level 3 in this RP corresponds approximately with the level of scope detail of a Class 4 (Pre-Feasibility in NI 43-101) estimate. A Class 3 (Feasibility in NI 43-101) control level estimate typically requires further WBS breakdown than covered in this RP.

As mentioned previously, this RP defers to the Level 1 coding structure for the discipline or prime account direct cost elements defined in RP 21R-98 while extending some elements to Level 2. The combination of product and discipline coding is intended to support the typical level of breakdown used for benchmarking and conceptual estimating (e.g., cost for equipment in the in-pit crushing area).

This guideline recognizes that mining and mineral processing projects often include a complex combination of mine, process plant and infrastructure scope elements, and having a unified, hierarchical coding structure considering all

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these parts together is of value (i.e., rather than relying on ISO 19008, ICMS or other codes that consider parts of the investment in isolation). As universal coding structures evolve, this RP is intended to serve as a reference to inform and guide those efforts in respect to mining and mineral processing.

It is understood that each project will develop a unique WBS for project control purposes, and as such, no standard WBS can be applied to every project. However, if each project were to develop its WBS in consideration of or informed by this guideline, translation of the specific project data to general industry metrics will be facilitated.

MEASUREMENT AND METRICS

The purpose for the structure includes facilitating development of mining specific cost metrics to be used in benchmarking and validating mining project estimates at different levels or preparing conceptual (Class 5) estimates. Examples of mining specific metrics at Level 1 include but are not limited to:

- Mine development costs (\$ million) per ore resource basis (million tons [mt]) (for underground, open-pit, and open-cast)
- Mine development cost (\$ thousand) per pit depth (m) (for open-pit and open-cast)
- Mine equipment costs per (\$ thousand) annual ore production (million tons per annum [mtpy]) per mine depth (m) (for underground)
- Infrastructures costs (\$ million) per mine capacity (mtpy), including ore and waste (for underground, open-pit and open-cast)
- Infrastructures costs (\$ million) per ore production capacity (mtpy) (for underground, open-pit and open-cast)
- Processing plant cost per nameplate product production capacity (e.g., mtpy) (for entire plant or by unit)
- Process equipment costs per nameplate product production capacity (e.g., mtpy) (for entire plant or by unit)

At Level 3, the metrics would usually be in respect to the capacity of the functional unit (e.g., kW of power generation or volume of tanks, etc.). For disciplines, the metrics would be key quantities by discipline (e.g., volume of concrete, area of buildings, etc.). Proposed key measurements are provided with the accounts.

BACKGROUND

An initial reference guideline that led to this RP's development was developed by the joint industry group (see ref: IPA, Inc.) That group used a practical approach rather than a theoretical one. Real breakdowns were gathered from the major owner companies in the initial working group and then dissected and organized into a consensus product. The actual breakdowns reviewed usually went to a lower level than that shown, but getting consensus at more detail levels was difficult, and less meaningful for benchmarking. This RP incorporates appropriate comments from the industry at-large.

It is important to note that the WBS in this RP includes separate accounts (6000 to 9000) for *common* and what are often called *indirect* costs based on the assumption that the various facility area accounts (1000 to 5000) are engineered and constructed as an integrated project wherein direct costs (and incidental indirects) are captured for each area and most major indirect costs are shared (e.g., overall camp, scaffolding and other support contracts for the site). However, if each area is executed as a separate project in a program, each with its own recorded indirect costs, it may be appropriate to capture some *common* and indirect costs as a discipline or prime account element. That is how RP 21R-98 is structured; it includes indirect cost categories with the prime accounts. That is also how

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many contractors will capture their indirect costs. Owners may not have visibility as to contractor indirect costs (e.g., embedded in unit prices) except for major common facilities and support.

The challenge remains for the user to capture common and indirect costs, allocate them (or not) to the various areas to assure consistent benchmarking, validation and conceptual estimating application. It is essential that the treatment of these costs be documented in the basis of estimate or similar record of analysis.

DISCIPLINE OR PRIME ACCOUNT STRUCTURE

Table 1 lists the *direct* disciplines or prime accounts from RP 21R-98 for the process industries along with additional recommended coding at Level 2 for mining. *Mobile Equipment* is of particular added importance to mining.

21R-98 Primary Categories	103R-19; Level 2	Level 2 Description
Civil and Marine	Marine	Jetty, dock, intake/outfall or other offshore work
	Earthwork	Site investigation, preparation, general excavation, backfilling, etc.
	Civil	Site & infrastructure improvements such as piling, ponds, culverts, roads, rail, etc.
Concrete	See 21R-98	
Structural Steel	See 21R-98	
Buildings & Architectural	See 21R-98	
Equipment	Mobile Equipment	Surface and underground mining production equipment (e.g., trucks, shovels, etc.)
	Mechanical Bults	Metallic and nonmetallic bults (e.g., insulation, liners, refractory, etc.)
	Mechanical Equipment	Processing and materials handling equipment (e.g., pumps, crushers, mills, bins, separation equipment, dryers, etc.)
Piping and Process Air Ductwork	Piping	Pipe scope related to process plant
	Pipeline	Pipe scope related to transportation
	Ductwork	Sheet metal for process air, fumes, and gases (ducts, exhausts, vents, hoods, etc.)
Electrical	Electrical Equipment	High voltage equipment (e.g., substations, transformers, switches) and central systems (e.g., security, fire, communication, etc.)
	Electrical Bults	Conductor, raceway, grounding, distribution switches and devices, etc.
Instrumentation/Process Controls	See 21R-98	
Protective Coatings	See 21R-98	

Table 1. Disciplines or Prime Accounts; Direct Field Costs

Table 2 provides suggested key quantities for the discipline accounts. Note that some disciplines are not meaningful in aggregate at the high level shown (noted by n/a) but may exist in a lower level, e.g. Level 3. For example, civil may or may not include piling which would be measured in number of piles, which is not meaningful if the site does not need piling.

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Discipline Account		L1 Key Quantity
Civil and Marine	Marine	n/a
	Earthwork	Cubic Meters (Cubic Yards)
	Civil	n/a
Concrete		Cubic Meters (Cubic Yards) Cast-in-Place
Structural Steel		Tonnes (Tons)
Buildings & Architectural		Square Meters (Square Feet)
Equipment	Mobile Equipment	Number by type
	Mechanical Bulks	n/a
	Mechanical Equipment	Number by type
Piping and Process Air Ductwork	Piping	Meters (Feet)
	Pipeline	Diameter-Inch-Mile (Diameter-Centimeter-Kilometer)
	Ductwork	Tonnes (Tons)
Electrical	Electrical Equipment	n/a
	Electrical Bulks	Meters (Feet) Conduit/Raceway
Instrumentation/Process Controls		Number Instruments
Protective Coatings		n/a

Table 2. Key Quantities for Disciplines or Prime Accounts

WORK BREAKDOWN STRUCTURE (PRODUCT, DELIVERABLE, AND FUNCTIONAL ELEMENTS)

Table 3 lists the Level 1 accounts for breakdown of mining and mineral processing project product, deliverable or functional elements. Accounts 1000 to 5000 are for direct costs that can be accounted for to specific areas. Accounts 6000 to 9000 are for common elements and indirect costs for the overall facility. The measure column shows cost/cost estimating and validation ratios or metrics that can be developed at this level for common and indirect elements, including on and off-site infrastructure, relative to the core production elements. The four-digit code is for purposes of clarity of this RP as to levels and not to suggest these numbers be used in practice.

Level 1	Category	Measure
1000	Mine/Mining Area	See Table 4 below
2000	Raw Feed Material Handling/Processing	See Table 4 below
3000	On-Site Infrastructure	Ratio to Σ1000-2000
4000	Product Transportation	See Table 4 below
5000	Off-Site Infrastructure	Ratio to Σ1000-3000
6000	Common Construction Facilities and Services	Ratio to Σ1000-5000
7000	Implementation Contractors (Engineering, Procurement, Construction Management)	Ratio to Σ1000-5000
8000	Owner's Costs	Ratio to Σ1000-5000
9000	Contingency, Escalation, and Other Provisions (<i>note: contingency and escalation are only applicable to estimates</i>)	Ratio to Σ1000-5000

Table 3 – WBS Level 1

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For the core production elements (1000, 2000, 4000), Table 4 provides details of typical cost/capacity measures for the respective elements (see the Measurement section of examples of metric usage). Table 4 and 5 metrics are particularly useful for preparation of Class 5 estimates and high-level validation of all estimates.

Area	Measure	Applies to:
1000: Mine		
Ore/mineral resource basis	million tonnes [mt] (million tons)	all mines
Pit depth	meters [m] (feet)	open-pit and open-cast mines
Mine depth;	meters [m] (feet)	underground mines
2000: Material Handling		
Raw ore/mineral production	million tonnes per annum [mtpy] (million tons per annum)	all mines
Waste production	million tonnes per annum [mtpy] (million tons per annum)	all mines
2000/4000: Processing and Product Transport		
Nameplate capacity	million tonnes per annum [mtpy] (million tons per annum)	entire plant and by unit

Table 4 – Measure Applicable to WBS Level 1

Table 5, in the Appendix, lists the Level 1 through 3 accounts for breakdown of mining and mineral processing project product, deliverable or functional elements. The table includes measures associated with each account where applicable. See the discussion of the relationship of Levels and Classes of estimate in the Purpose section.

REFERENCES

- [1] AACE International, Recommended Practice No. 20R-98, Project Code of Accounts, Morgantown, WV: AACE International, Latest revision.
- [2] AACE International, Recommended Practice No. 21R-98, Project Code of Accounts - As Applied in Engineering, Procurement, and Construction, Morgantown, WV: AACE International, Latest revision.
- [3] AACE International, Recommended Practice No. 47R-11, Cost Estimate Classification System - As Applied in the Mining and Mineral Processing Industries, Morgantown, WV: AACE International, Latest revision.
- [4] Canadian Securities Administrators (CSA), National Instrument 43-101 - Standards of Disclosure for Mineral Projects, Latest Revision.
- [5] International Standards Organization (ISO), ISO 19008:2016, Standard cost coding system for oil and gas production and processing facilities (formerly Norsok Standard Z-014), 2016.
- [6] International Construction Measurement Standards (ICMS) Coalition, International Construction Measurement Standards (ICMS): Global Consistency in Presenting Construction Costs, 2017.
- [7] T. Ellis, "Mining and Mineral Processing Uniform Cost Coding Structure," in *AACE® International Transactions*, Morgantown, 2017.
- [8] OmniClass Secretariat, OmniClass Table 11 - Construction Entities by Function, 2012.
- [9] AACE International, Recommended Practice No. 10S-90, Cost Engineering Terminology, Morgantown, WV: AACE International, Latest revision.
- [10] H. L. Stephenson, Ed., Total Cost Management Framework: An Integrated Approach to Portfolio, Program and Project Management, 2nd ed., Morgantown, WV: AACE International, Latest revision.

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APPENDIX – WBS LEVEL 1 TO 3 (INCLUDING MEASURES)

Code Number	Code Name		Description
1000	Mine/Mining Area		
1100	Open Pit Development		All pre-production costs associated with open pit mine operations
	1110	Pre-strip Overburden	Pre-stripping of waste; includes operators, fuel, and maintenance; ideally collected by mine accounting system
	1120	Mine Stockpiling	Pre-production ore mined and stockpiled before process plant is in operation; includes operators, fuel, and maintenance
	1130	Waste Dumps	Pre-production construction of waste dumps; includes stripping and grubbing, drains and diversions, and toe construction
	1140	Open Pit Mine Development Common Facilities and Services	Facilities or services not covered below that are specifically and exclusively used within the open pit mine
1200	Underground Mine Development		All preproduction costs associated with underground mine access operations
	1210	Access Development	Preliminary costs for access portal, decline, or shaft development; contractor or owner costs
	1220	Mine Stockpiling	Preparation of stockpiles, including clearing, recontouring, lining, drains, and diversions
	1230	Waste Dumps	Preparation of waste dumps, including clearing, recontouring, lining, drains, and diversions
	1240	Level Access Development	Preparation of level access, including blasting excavation, hauling, and ground support
	1250	Haulage Development	Preparation of haulage development, including blasting excavation, hauling and ground support, ventilation, and electrical infrastructure
	1260	Reef Development	Preparation of reef development, including blasting excavation, hauling, and ground support
	1270	Return Airways	Excavation/installation of exhausting air passages
	1280	Vertical Development	Preparation of vertical development, including blasting excavation, hauling and ground support, ventilation, and electrical infrastructure
1300	Mine Equipment		Capital costs for various types of mining equipment, including purchase and assembly costs; excludes freight, insurance, duty, and spares
	1310	Drilling Equipment	Blasthole drills and track drills
	1320	Loading Equipment	Shovels, excavators, backhoes, and front-end loaders
	1330	Hauling Equipment	Haul trucks and articulated haul trucks
	1340	Support Equipment	Track-type and rubber-tire dozers, motor-graders, and water trucks, etc.
	1350	Mine Maintenance Equipment	Fuel trucks, lube trucks, service cranes, tool handlers, and tire handlers, etc.

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Code Number		Code Name		Description
	1360		Dispatch System	Dispatch building, GPS equipment, and software dithering towers, etc.
1400		Open Pit Mine Infrastructure		Capital costs for infrastructure within the open pit
	1410		Mine Roads	Haul road construction; contractors or mine operators; purchased materials such as geocloth, road material, culverts, or bridges
	1420		Pioneering	Preproduction costs associated with establishing open pit mine areas; layout and survey, tree clearing, and pioneer roads, etc.
	1430		Dewatering	Costs for drilling and casing holes, pumps, electrical reticulation, and collection pipelines
	1440		Truck Shop	Mine equipment shop or shops, including truck wash, tire change, lubrication storage and distribution; may include integrated office, warehouse, or change facility
	1450		Explosive Magazine	Construction costs, including site preparation, foundations, buildings, internal fit-out, machinery, and equipment; excludes engineering, first fills, and spares
	1460		Planning and Exploration	Preproduction costs associated with planning and exploration, access roads, drill platforms, drilling cost, bulk samples, exploration trenches, core logging, and storage
	1470		Mine Facilities and Services (offices, canteen, refuges, first aid)	Facilities or services that are specifically and exclusively used for the open pit mine; not part of the truck shop and not services that relate directly to preproduction
1500		Underground Mine Infrastructure		All preproduction costs associated with underground mine infrastructure beyond access development
	1510		Mine Roads	Roads
	1520		Development	Development
	1530		Dewatering	Dewatering
	1540		Truck Shop	Truck shop
	1550		Explosive Magazine	Explosive magazine
	1560		Mine Stockpiling Platforms	Mine stockpiling platforms
	1570		Timber Preparation Facilities	Timber preparation facilities
	1580		Mine Facilities and Services (offices, canteen, refuges, first aid)	Mine facilities and services (offices, canteen, refuges, first aid)
1600		In-Pit Material Handling		Facilities under the control of the mining department that are used for handling ore
	1610		In-Pit Crushing	Mobile or semi-mobile crushers or screens, including foundations and buildings, equipment for breaking rocks, removing boulders, and dust collection; unit substations for crushers

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Code Number		Code Name		Description
	1620		In-Pit Conveying	In-pit conveyors, including earthworks, foundations, frames, drives, belts, electrical systems, and fire protection, etc.
	1630		In-Pit Material Handling Facilities and Services	Operators offices and toilets
1700		Underground Material Handling		All preproduction costs associated with material handling
	1710		Ore and Waste Passes	Excavation and support for ore and waste passes
	1720		Underground Crushing	Underground crushing plant and equipment, including foundations, structural, steel, piping, and electrical and instrumentation
	1730		Underground Conveying	Underground conveying plant and equipment, including foundations, structural, steel, piping, electrical, and instrumentation
1800		Mine Shaft		All preproduction costs associated with the mine shaft beyond access development
	1810		Shaft Development	Excavation, support, structural steel, piping, and electrical
	1820		Head Frame	Detail excavation, foundations, structural, architectural lighting, and building services
	1830		Hoisting	Equipment, including wire rope, electrical, and instrumentation
1900		Miscellaneous Mine Facilities		Miscellaneous mine facilities
2000		Raw Feed Material Handling/Processing		
2100		ROM Materials Handling and Stockpile/Storage		Includes the preliminary crushing, milling, and screening of the extracted mine material and interim stockpile/storage facility prior to onward refining/processing
	2110		ROM Overland Conveyor	Includes the contrivance, which extends from a receiving point to a discharge point
	2120		ROM Area	Includes receiving facilities, temporary storage or buffering facilities, and handling systems
	2130		Crushing and Screening (including oversizing)	Includes the size reduction into relatively coarse particles by stamps, crushers, or rolls, and the separation of solid materials of different sizes into defined sizes
	2140		Stockpiling	Includes the accumulation of ore build-up
	2150		Reclaiming	Includes the reprocessing of previously rejected material or digging from stockpiles
	2160		Milling	Includes the grinding or crushing of ore
	2170		Mining Concentrate Distribution and Storage	Mining concentrate distribution and storage
2200		Ore Reduction and Concentration		Includes the reduction and concentration of ore
	2210		Potline	Includes a row of electrolytic cells for reducing certain metals, such as aluminum, from fused salts

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Code Number		Code Name		Description
	2220		Redside	Includes entire alumina refining process up to red mud disposal
	2230		Concentrator Facilities	Concentrator facilities
	2240		Smelter and Slag Concentrator	Smelter and slag concentrator
2300		Ore Processing		Includes primary processing of the ore following the preliminary crushing, milling, and screening of the extracted mine material
	2310		Coal Preparation Plant	Includes a facility that washes coal off soil and rock, crushes it into graded-sized chunks (sorting), stockpiles grades preparing it for transport to market, and loads coal into rail cars, barges, or ships
	2320		Carbon Plant	Carbon plant
	2330		Liquor Extraction and Evaporation	Liquor extraction and evaporation
	2340		Smelting and Hydromet	Smelting and hydromet
	2350		Heap Leach	Heap leach
	2360		Mineral Concentration Plant	Mineral concentration plant
	2370		Main Fertilizer Complex	Main fertilizer complex
2400		Ore Separation and Refining		Includes primary processing of the ore following the preliminary crushing, milling, and screening of the extracted mine material
	2410		Cast House	Cast house
	2420		White Side	White side
	2430		Ore Separation	Ore separation
	2440		Anode Refining and Casting	Anode refining and casting
	2450		Gold Recovery and Carbon Handling	Gold recovery and carbon handling
	2460		Pellet Plant	Pellet plant
	2470		Process/Refining	Process/refining
2500		Chemical Storage and Dosing		Includes preliminary hydrometallurgical processing or support to product processing or product refining and storage of chemicals
	2510		Gas Generation and Storage	Gas generation and storage
	2520		Acid Reveal Generation and Storage	Acid reveal generation and storage
	2530		Chemical (Dry) Reveal/Generation, Storage	Chemical (dry) reveal/generation and storage
2600		Residue, Rejects, and Tailings Handling and Storage		Includes equipment to manage waste, residue, rejects, and tailings; dams are included separately

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Code Number	Code Name		Description
	2610	Reject System	Includes the refuse extraction system that may be manually or automatically operated
	2620	Tailings System	Includes all aspects of tailings system (ponds and pipelines, etc.)
	2630	Tailings/Residue Storage Dams	Includes dams to which slurry is transported, the solids settling so the liquid may be withdrawn
	2640	Tailings/Residue Stockpile	Includes the tailings handling, reclaim water, and seepage water collection system
2700	Product Handling, Storage, and Load-Out		Includes handling equipment and storage areas for product storage
	2710	Stacking and Stockpile	Includes the accumulation of mineral build-up
	2720	Reclaiming	Includes the reprocessing of previously rejected material or digging from stockpiles
	2730	Load-Out	Includes loading the product to be taken out of the mine
2900	Ancillary Facilities		Includes common buildings, warehouses, stores, and workshops to support the mine and processing facilities
3000	On-Site Infrastructure		
3100	Existing Facilities Removal, Remediation, or Relocation		Legacy structures, buildings plant, or equipment; existing buildings that will be removed, relocated, re-purposed, or demolished
	3110	Existing Process Facilities	Legacy process equipment, including existing buildings, process equipment, or tanks to be removed, relocated, repurposed, or demolished
	3120	Existing Infrastructure Facilities	Existing infrastructure, buildings, transmission lines, warehouses that will be removed, relocated, repurposed, or demolished
	3130	Existing Community Buildings	Legacy structures, buildings, or construction used for community purposes; includes church, cemetery, recreation center, or other public use buildings to be relocated or demolished
	3140	Existing Residential Buildings	Existing residential structure; house, shed, or garden; any construction or garden, tree, or outbuilding that was principally associated with and used as part of a dwelling that will be relocated or demolished
	3150	Existing Civil Structure	Legacy civil structures, dams, diversions, or embankments that will be removed, relocated, repurposed, or demolished
3200	On-Site Roads and Platforms		
	3210	Project Roads	Project roads, including bridges and other water crossings
	3220	Exploration Roads	Exploration roads, including bridges and other water crossings
	3230	Parking Areas	Automobile, bus, and truck parking and queuing areas
	3240	Exploration Platforms	Exploration platforms for drilling and temporary facilities
	3250	On-Site Helipad or Airstrip	On-site helipad or airstrip, including buildings, navigational aids, and fuel station

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Code Number		Code Name		Description
	3260		On-Site Retaining Walls or Structure	On-site retaining walls or structures that are not part of roads or other structures such as crusher buildings
3300		On-Site Non-process Facilities		All non-process permanent buildings and facilities within the site
	3310		Permanent Accommodation	Facilities for sleeping, cooking, food storage and dining, and recreation
	3320		Security/Medical Facilities	Guard house, watch tower, inspection station, medical clinic, nursing station, and ambulance or fire truck parking
	3330		General Offices/Main Administration Building	Buildings for general and administrative functions, human resources, purchasing, accounting, and community relations, etc.
	3340		Assay Laboratory/Other Laboratories	Buildings and facilities for laboratory functions; assay, oil analysis, and environmental samples, etc.
	3350		Plant Warehouse/Shop	Buildings and facilities for warehousing, storing, and protecting equipment; spare parts; supplies; and materials; also for workshops, garages, and repair shops
	3360		Change House/Dry Building	Buildings for changing, showering, and laundering uniforms, etc.
	3370		Training Building/Facilities	Buildings and facilities for training, instruction, testing, and skills development
3400		Mobile Equipment		Mobile equipment for maintenance and transportation; includes tractors and loaders for stockpile re-handle; mobile cranes, buses, and utility vehicles
	3410		Mobile Maintenance Equipment	Includes equipment that is mobile and directly contributes to the facility maintenance mission
	3420		Mobile General and Administration Equipment	
3500		On-Site Bulk Storage		On-site tanks, pressure or non-pressure vessels, pumps, and related equipment; sheds and prepared hardstand or paved areas to store bulk materials
	3510		Water	Water
	3520		Potable Water Bulk Storage	Potable water bulk storage
	3530		Gland Water Bulk Storage	Gland water bulk storage
	3540		Fire Water Bulk Storage	Fire water bulk storage
	3550		Fuel – HFO and Diesel	Fuel – HFO and diesel
	3560		Propane	Propane
	3570		Bulk Storage Facilities and Services	Bulk storage facilities and services
3600		On-Site Services/Utilities		On-site distribution and delivery of utilities (excluding communications and power); note that distribution is separate from bulk storage
	3610		On-Site Fresh Water	On-site fresh water

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Code Number	Code Name		Description
	3620		On-Site Potable Water On-site potable water
	3630		On-Site Process Water On-site process water
	3640		On-Site Fire Systems On-site fire systems
	3650		On-Site Environmental Monitoring On-site environmental monitoring
	3660		On-Site Effluent On-site effluent
	3670		On-Site Other Utilities (Compressed Air, Propane) On-site other utilities (compressed air and propane)
	3680		On-Site Security Systems On-site security systems
	3690		On-Site Utilities, Facilities, and Services On-site utilities, facilities, and services
3700		On-Site Power Supply and Transmission	Includes both primary and standby power generation plants; on-site switchyards, substations, and underground or overhead electrical distribution
	3710		Switchyard Includes an enclosed area of a power system containing the switchgear
	3720		On-Site Transmission – Power Distribution Includes medium-voltage (less than 50 kV) power lines, low-voltage electrical substations and pole-mounted transformers, low-voltage (less than 1,000 V) distribution wiring, and sometimes the electricity meter
	3730		Main Substation Main substation
	3740		Power Generation Power generation
	3750		On-Site Power Supply Facilities and Services On-site power supply facilities and services
3900		Miscellaneous On-Site Infrastructure Facilities	
4000		Product Transportation	
4100		Railways	Includes right-of-way, tracks, buildings, and distributed power such as trolley connections
	4110		Embankment and Cuttings Includes embankment and cuttings for rail infrastructure
	4120		Roads and Crossing Includes maintenance, access roads, and level crossings
	4130		Bridges and Tunnels Includes bridges, crossings, and tunnels
	4140		Train Control/Signaling Includes signaling infrastructure and traffic management system
	4150		Communications Includes fixed networks and mobile communications
	4160		Electrification Includes bulk power, traction power, and overhead wiring
	4170		Rolling Stock Includes locomotives, bogies, and maintenance and support equipment
	4180		Maintenance Depots Includes stabling, washing, and fit-out facilities, test track, and maintenance facilities
	4190		Railways Ancillary Facilities Includes any facilities that support railway system operation

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Code Number		Code Name		Description
4200		Port Facilities		Docks, weirs, trestles, ship loading, or unloading cranes or equipment; retaining walls or structures; dredging; navigational aids
	4210		Port Site Development and Utilities	Includes port site development, including site preparation and dredging and utilities
	4220		Port Concentrate Receiving	Port concentrate receiving
	4230		Port Concentrate Storage and Handling	Port concentrate storage and handling
	4240		Port Coal Storage and Handling	Port coal storage and handling
	4250		Ship Loader	Ship loader
	4260		Port Berth	Port berth
	4270		Port Marine Structure	Port marine structure
	4280		Port Ancillary Facilities	Includes any facilities that support port system operation
	4290		User Defined	User defined
4300		Airport Facilities		Runways, aprons, navigational aids, and lights; terminal buildings, fuel storage, and distribution
	4310		Airport Runways	Earthmoving, paving, lighting, and navigation aids
	4320		Airport Taxiways	Earthmoving, paving, and lighting
	4330		Airport Aprons	Earthmoving, storm water management, snow melting, paving, and lighting
	4340		Airport Passenger Terminal Buildings	All costs associated with passenger terminal building construction, from earthmoving to commissioning inclusive
	4350		Airport Freight Handling Facilities	All costs associated with freight handling facilities construction, from earthmoving to commissioning inclusive
	4360		Airport Facilities and Services	Airport facilities and services, including aviation fuel systems, ground support systems, and air traffic control (if separate from terminal building), etc.
4900		Miscellaneous Product Transportation Facilities		Miscellaneous product transportation facilities
5000		Off-Site Infrastructure		
5100		Off-Site Roads/Water Diversions		Off-site access roads, including bridges, multiplate tunnels, or culverts; water diversion ditches, dikes, or trenches
	5110		Off-Site Roads	Off-site roads
5200		Off-Site Facilities		Off-site permanent buildings or facilities; includes buildings, accommodation, and railways
	5210		Off-Site Permanent Buildings (Not Accommodation)	Off-site permanent buildings; includes offices, logistics centers, warehouses, and laboratories but not accommodation
	5220		Off-Site Railways	Off-site railways; includes right-of-way, tracks, buildings, and distributed power such as trolley connections

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Code Number		Code Name		Description
	5230		Off-Site Accommodation	Off-site permanent accommodation; includes camps, hotels, or housing projects (not intended for construction)
	5240		Off-Site Solid Waste Storage	Off-site facilities and structures for solid waste storage and disposal
	5250		Off-Site Hazardous Waste Storage	Off-site facilities and structures for solid and liquid hazardous waste storage and disposal
5300		Off-Site Mobile Maintenance Equipment		Off-site mobile equipment, including cranes, trucks, loaders, and snow blowers
5400		Off-Site Pipelines and Bulk Storage		
	5410		Off-Site Water Pipeline	Off-site water pipeline, including pumping station, service road, and energy dispersing station, etc.
	5420		Off-Site Fuel Pipeline	Off-site fuel pipeline, including pumping station, service road, and pigging station, etc.
	5430		Off-Site Concentrate Pipeline	Off-site concentrate pipeline, including pumping station, service road, and energy dispersing station, etc.
	5440		Off-Site Water Bulk Storage	Off-site dams, reservoirs, ponds, or tanks used to store water
	5450		Off-Site Fuel Bulk Storage	Off-site fuel storage facility dedicated to the mine or project for highway fleet, power generation, or mining fleet fuel
	5460		Off-Site Concentrate Bulk Storage	Off-site concentrate storage facility dedicated to the mine or project, includes filtering, handling, blending, and loading
5500		Off-Site Services/Utilities		Off-site distribution and delivery of utilities (excluding power); note that distribution is separate from bulk storage
	5510		Off-Site Fresh Water Distribution	Off-site fresh water collection and distribution piping
	5520		Off-Site Potable Water Distribution	Off-site potable water collection and distribution piping
	5530		Off-Site ARD Water Distribution	Off-site ARD water collection piping
	5540		Off-Site Fire Water Distribution	Off-site fire water distribution piping
	5550		Off-Site Environmental Monitoring	Off-site collection and monitoring stations for environmental monitoring: Dust, water, and air quality, etc.
	5560		Off-Site Communications	Off-site communications infrastructure
	5570		Off-Site Effluent Utilities	Off-site effluent water collection facilities and piping
	5580		Off-Site Other Utilities (Compressed Air and Propane, etc.)	Off-site utilities facilities and piping
	5590		User Defined	User defined
5600		Off-Site Power Supply and Transmission		Off-site primary power generation plants; off-site switchyards, substations, and underground or overhead electrical distribution

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Code Number	Code Name		Description
	5610		Switchyard
	5620		Off-Site Transmission
	5630		Main Substation
	5640		Power Generation
	5650		Off-Site Power Facilities and Services
5900		Miscellaneous Off-Site Facilities	
6000		Common Construction Facilities and Services	
6100		Temporary Construction Facilities	
	6110		Temporary Site Facilities
	6120		On-Site Processing Facilities
	6130		Temporary Utilities
	6140		Temporary Off-Site Facilities
6200		Construction Support	
	6210		Operation and Maintenance of Construction Facilities and Utilities
	6220		Material Handling and Warehousing
	6230		On-Site Services
	6240		Labor Enhancement
	6250		Manual Labor Project-Specific Allowances
	6260		General and Final Clean-Up
6300		Construction Equipment, Tools, and Supplies	
	6310		Construction Equipment and Light Vehicles (Including Maintenance)
	6320		General Purpose Scaffolding, Cribbing, and Dunnage
	6330		Tools and Consumables (Common/Owner Supplied)
	6340		Fuels and Lubricants
6400		Pre-commissioning Costs	

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Code Number	Code Name		Description
6500	Workforce Transport – Flights and Buses		
	6510	Flights	Flights
	6520	Buses	Buses
6600	Project Accommodation		
	6610	Camp Construction	Camp construction
	6620	Camp Operation and Maintenance	Camp operation and maintenance
	6630	Camp Back Charges	Camp back charges
	6640	Cost of Rented Accommodation (Includes Furniture Allowance, Utilities, etc.)	Cost of rented accommodation (includes furniture allowance and utilities, etc.)
6900	Miscellaneous Common Distributables		
7000	Implementation Contractors (Engineering, Procurement, Construction Management)		
7100	Engineering Services		
	7110	Non-Manual Labor Costs – Project Office	Non-manual labor costs – project office
	7120	Non-Manual Labor Expenses	Non-manual labor expenses
	7130	Project Office Expenses	Project office expenses
	7140	Overhead and Fee (If Not Included in Hourly Charge Rates)	Overhead and fee (if not included in hourly charge rates)
7200	Construction Services		Construction services
7300	Engineering and Construction Distributable Costs		Engineering and construction distributable costs
7900	Miscellaneous Engineering, Construction Management Services Costs		Miscellaneous engineering, construction, and management services costs
8000	Owner's Costs		
8100	Owner's Management Team		Includes all owner management team costs from the start of project definition continuing up to, but not including, startup
	8110	Owner's Team	Includes costs for owner's management team's project manager and assistants, such as engineering manager, project engineers, owner's representatives on project management team, construction, commissioning, fabrication, or other functional representative/manager on team
	8120	Nonmanual Labor Expenses	Nonmanual labor expenses

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Code Number	Code Name		Description
	8130		Home Office Expenses Home office expenses
	8140		Project Office Expenses Project office expenses
	8150		Site Office Expenses Site office expenses
8200		Corporate Overheads	
	8210		General Corporate Overheads Includes costs or expenses inherent in performing a function (i.e., engineering, construction, or operating) that cannot be charged to or identified with a part of the work, product, or asset)
	8220		Corporate Affairs and Administration Includes general administrative support functions, travel, training, meetings, leave, supervision, and budget formulation, etc.
8300		Legal and Permitting	
	8310		Legal Time Charge Legal time charge
	8320		Legal Expenses Legal expenses
	8330		Permitting Expenses Permitting expenses
8400		Insurance, Bonds, Fees, and Financing Costs	
	8410		Insurances Insurances
	8420		Bonds Bonds
	8430		Fees Fees
	8440		Financing Costs and Interest During Construction Financing costs and interest during construction
8500		Taxes, Duties, and Licenses	
	8510		Taxes, Duties, and Customs Taxes, duties, and customs
	8520		Government Approvals Government approvals
	8530		Permits and Licenses Permits and licenses
	8540		Technology Fee – CAPEX Component Technology fee – CAPEX component
8600		Communities	
	8610		Capacity Building Capacity building
	8620		Compensation Compensation
	8630		Support Support
8700		Land and Rights-of-Way	
	8710		Land Purchases – On-Site Land purchases – on-site
	8720		Land Purchases – Off-Site Land purchases – off-site
	8730		Rights-of-Way Rights-of-way
	8740		Easement Easement
8800		Incentivization Schemes	Incentivization schemes

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Code Number		Code Name	Description
8900		Preproduction Costs	Owner's preproduction team; all labor and burden costs; expenses associated with staff, offices, travel, and training; preproduction fuel, reagents, utilities, and other costs related to operations prior to production; does not include costs related to pre-stripping
	8910	Recruitment and Training of Operation and Maintenance Staff	Recruitment and training of operation and maintenance staff
	8920	Wet Commissioning	Wet commissioning
	8930	Post-commissioning Modifications	Post-commissioning modifications
	8940	Ramp-Up	Ramp-up
	8950	Working Capital	Includes the funds, in addition to fixed capital and land investment, that a company must contribute to the project (excluding startup expense) to start the project and meet subsequent obligations as they come due
	8960	Capital Light Plant and Equipment for Operations	Capital light plant and equipment for operations
	8970	First Fills	First fills
	8980	Information Management Systems	Information management systems
	8990	Miscellaneous Expenses	Miscellaneous expenses
9000		Contingency, Escalation, and Other Provisions	
9100		Contingency	The amount budgeted to cover costs that may result from incomplete design, unforeseen and unpredictable conditions, or uncertainties
9200		Escalation	The amount budgeted to cover normal wage and price inflation from the date of the estimate to the project's planned completion
9300		Foreign Exchange	Foreign exchange
9900		Other Provisions	Other provisions

Table 5 – WBS Level 1 to 3 (including Measures)